Getting Kids Excited about Science, One Saturday at a Time

Ainissa G. Ramirez / Yale University

Abstract

Section: Active and Self-Directed Learning

Science Saturdays (*www.sciencesaturdays.org*), is a fun science show for children of all ages to inspire them with the joy of learning science and engineering. It raises the profile of science and engineering by engaging its audiences with the **3Ds—donuts, demonstrations and dynamic lectures.** Started at Yale in 2004, this award-winning program has held nearly forty live lectures and has been disseminated via the web and by DVDs that are distributed to schools and libraries. Using a short lecture format of 40 minutes, science is brought to audiences in a concise and meaningful way. Audiences also learn by hands-on demonstrations and with direct contact with scientists. The program's success hinges on its commitment to bring excellent communicators of science to the general public. Scouting out talented science communicators manifests this. In some cases, scientists are trained to be better communicators, which enables them to give more effective presentations to both technical and non-technical communities. **Science Saturdays** aims to broaden the participation of girls and under-represented groups, by showcasing diverse speakers of various backgrounds. Its long-term goal is to inspire more children by expanding to other locations by building a sustainable and networkable infrastructure. The development of a web presence to enable 24-hour learning is also desired.

Introduction/Objectives

Science, technology, engineering and math (STEM) efforts in the US are at a tipping point, where many indicators show a loss in competitiveness. However, 50% of future jobs will be related to technology. To increase the number of science learners, scientists must engage and inspire the general public, particularly K-12 learners, with science. A recent PISA report indicates that American 15-year-olds ranked 24th out of 57 countries in science and 32nd in mathematics.

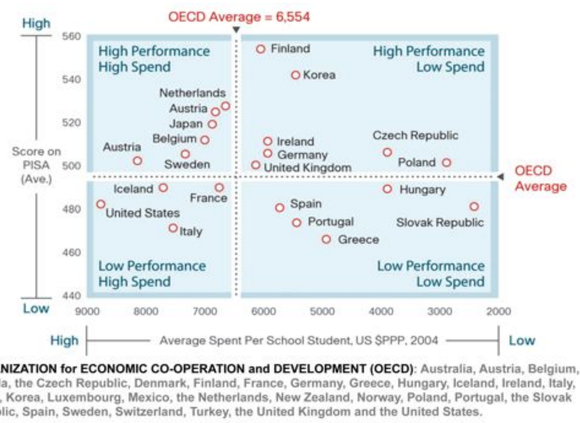
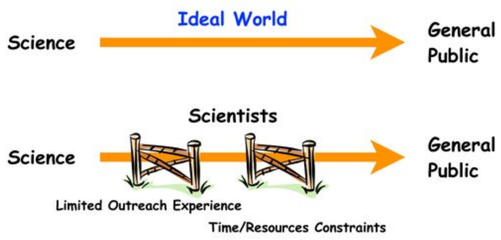


Figure 1. A graph showing STEM performance versus cost per student for several countries.

We need new and innovative ways to teach and inspire science learning. Recently, President Obama has urged scientists to help prepare and inspire children with science. However, scientists are at an impasse: many want to be involved in science outreach, but many do not know where to get started. There is a need to make pathways for scientists to engage with the general public by instituting programs to remove barriers to science outreach. **Science Saturdays** serves as a conduit between science practitioners and science learners.



Developmental History of Innovation

The National Science Foundation requires two criteria: (1) intellectual merit, and (2) broader impact. The broader impact criterion is intended to connect science, technology, engineering, and math (STEM) research to the general public and was created to encourage scientists to step away from the lab and bring their knowledge to the general public. **Science Saturdays** was developed as a simple model to address the broader impact criterion.

3Ds: Donuts, Demonstrations and Dynamic Lectures

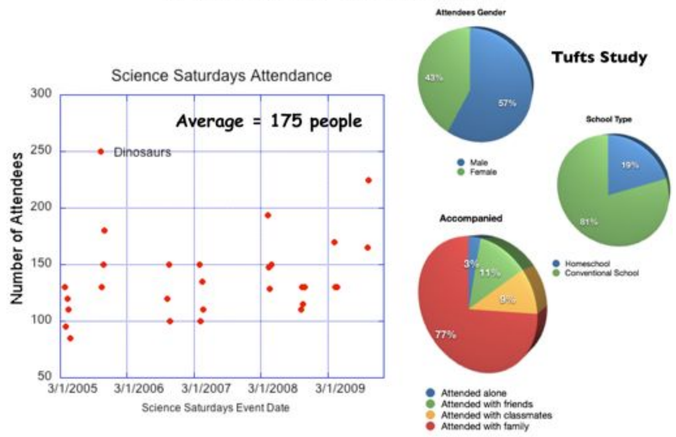


Table 1. Key Facts about Science Saturdays

Website	*www.sciencesaturdays.org*
Targeted Age Range	Lectures are targeted for 7th grade and up. The demonstration table is for all ages.
Cost	Free to Attendees. No registration
Where	Lectures are held in the Yale Engineering auditorium. (250 seats)
Number of Attendees	The average is 175 (See above figure).
When	Two months a year. Preferably Saturdays in October and April.
Dissemination	Live lectures; DVDs; podcasts, streaming video; local TV (CTV1)
What is a common event like?	Doors open at 10:30am and attendees are welcomed by a continental breakfast. There is a demonstration table staffed by undergraduates, which has a variety of hands-on activities and take-home projects. Lectures usually begin at 10:40 and last for 40 minutes, which is followed by a Q&A period.
Other Products	Downloadable Demonstrations: *www.strangematterexhibit.com/demoworks_final.pdf* (over 100,000 downloads since Feb 2006)
Assessment	Surveys developed by Tufts University have been administered. Findings are pending.
Topics	As of Nov. 2011, over 37 lectures ranging from topics such as "Why Birds Are Dinosaurs" to "Finding Human History in Your Spit "

Execution

To increase our impact, we must spread the word about our event.
Here is what we learned:

- It is best to contact science teachers by sending reminder postcards and by emailing them.
- Contacting under-represented groups requires reaching out to places of worship.
- Advertising should include: press releases, teacher distribution lists, homeschooling networks, websites, posters in public places (supermarkets, malls, bus/train stations, barbershops, beauty salons, & Laundromats), and by using local radio advertisements.

To continue to grow there are still many things that need to be addressed.
Here is what we need to learn:

- How do you reach new audience members and increase audience size.
- How to make the program sustainable (i.e. identifying funding, resources, & science speakers)
- What are the best methods to teach science communication.
- How to franchise to other locations and network the sites successfully.
- How to create an engaging web presence.

Major Issues

There is still much to do to create a national version of **Science Saturdays.** One barrier is funding and a level of evaluation/assessment that is satisfactory to potential funders. Another major issue is the development of a sustainable non-profit and the identification of its headquarters and satellite offices.

Our major issues are:

- Funders focus on learning science and not on the mission of inspiring kids. We are bogged down with the **"paralysis of analysis."**
- Better assessment/evaluation tools are needed.
- Development of a non-profit or partnerships needs to be address or identified.
- The poor economic climate makes the barrier find funding. We need to indentify receptive funders.
- We are still unaware of how the Internet can be used more effectively to inspire children. As such, online/Mobile App space remains untouched. We need to indentify best practices and adopt them.

Discussion

Science Saturdays has had direct impact in changing how children think about science and should be implemented nationally. Here are some testimonies:

"I want to be a paleontologist or an astronomer."
–A middle-schooler

"The first Science Saturdays, I had to wake my kids up to get them ready. The following Saturday they were dressed and ready to go..."
–A mother

"Can we have 52 of these lectures?"
–An adult

"My kid came for the donuts and also learned something too."
–A father

Networked science outreach programs are proving to be popular and effective models to create interest in science. Recently, the UK has instituted a network of science outreach centers at several hub cites, called the *Beacons for Public Engagement Initiative* (*www.publicengagement.ac.uk*), which is funded by the Wellcome Trust with a grant of £9.2m ($15M). A network of **Science Outreach Centers** (SOCs) in the US could benefit from the lessons learned in the UK and **Science Saturdays** could be one of the flagship programs for this unique model. As the data shows, we are losing science competitiveness and it is tantamount that we develop effective and new ways to **teach and inspire children with science.**

The development of a proposal for **Science Outreach Centers** is underway and will be submitted to NSF for consideration. Other potential funders need to be identified as well. Initial partners and locations have been identified, which include: NYC (NYSCI & Science Friday), the San Francisco Bay Area (Lawrence Hall of Science) and Boston (the Museum of Science, Boston). Secondary partners that would benefit from the science outreach centers include: Teach for America (professional development) and National Science Teachers Association (professional development).

We are at a critical time, with only one chance to change the course of science education in theUS. **The key to success is inspiration.** We need all children to want to know science, so that they will learn science.

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